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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appellants: MAKINO et al
Serial No.: 10/812,087
Filed: March 30, 2004
For: Vacuum Processing Apparatus
Group: 1763
Examiner: K. Moore

APPELLANTS' REPLY BRIEF UNDER 37 CFR §41.41

Mail Stop: Patent Appeals (Fee)
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

December 14, 2006

Sir:

This Reply Brief is being submitted in accordance with 37 CFR §41.41 in response to the Examiner's Answer dated October 23, 2006, as forwarded by a communication dated October 24, 2006, noting that on December 14, 2006, appellants filed a corrected Appeal Brief in response to the Notification of Non-Compliant Appeal Brief, mailed November 14, 2006. This Reply Brief is responsive to the new points of argument, as presented under the heading "(10) Response to Arguments" at pages 5 and 6 of the Examiner's Answer, with the following remarks being presented in accordance with paragraphs (1) – (6) thereunder.

The Examiner at pages 5 and 6 of the Examiner's Answer states:

(1) Applicant argues that neither the “liner” disclosed in Hao nor the “shield” disclosed in Nutescu are an “inner chamber” as claimed. However, the “liner” disclosed in Hao and the “shield” disclosed in Nutescu are structurally and functionally the same as “inner chamber” 509 of applicants’ disclosure. (emphasis added).

Applicants submit that the Examiner has mischaracterized appellants’ arguments, in that claim 7, the only independent claim on appeal, recites the features of:

a vacuum container in which an inside thereof is evacuated and which a wafer is processed using plasma therein;

an inner chamber detachably disposed inside the vacuum container and having an inner space for supporting the wafer thereon is disposed and in which a processing gas is supplied ... (emphasis added).

The vacuum container, as described in the specification of the application is represented by outer chambers 511 and 512, as illustrated in Figs. 5 - 8 of the drawings of this application, whereas the inner chamber is represented by chambers portions 509 and 510, as illustrated in such figures, and which portions are detachably removable from the vacuum container, in the manner illustrated in Figs. 7 and 8, with table 504, as illustrated in Fig. 5, for example, representing a wafer table for supporting the wafer thereon and being disposed within the inner chamber. Thus, the inner chamber and vacuum container are clearly described in the specification of this application.

While the Examiner, in paragraph (1), suggests that appellant has chosen to use different terminology than that of the prior art to distinguish features, the

Examiner's position is belied by the fact that it is prior art that has chosen to use different terminology for its disclosed structure. More particularly, Hao, the primary reference utilized by the Examiner in rejecting all claims under 35 USC 103 describes a "process chamber 104" (emphasis added) having a "liner 102" (emphasis added) disposed therein, referring to Figs. 3A and 3B. Additionally, Hao describes the prior art as shown in Figs. 1 and 2 thereof as having a "liner 12" and a "process chamber 14", wherein, "As shown in Fig. 2A, the liner 12 sits on the process chamber 14", (emphasis added) (col. 1, lines 60 - 61). Thus, Hao recognizes structural and functional differences in relation to utilizing the terminology of "liner" and "chamber". Similarly, Nutescu, which is utilized in combination with Hao describes a "chamber wall 10" (emphasis added) and a "shield 38" (emphasis added). As described in the "Summary of the Invention" of Nutescu, "The invention provides a method and apparatus for protecting the interior walls of a plasma processing reactor from erosion caused by the plasma and/or gases used to form the plasma. A removable, flexible shield made of electrically conductive material is provided which is compressed for placement into the plasma processing chamber, whereupon the shield expands from its compressed state so that it presses against the contours of the processing chamber walls". (emphasis added). Thus, irrespective of the contentions by the Examiner, while both Hao and Nutescu disclose and teach a vacuum container as represented by the chamber 104 of Hao and the chamber having the walls 10 of Nutescu, neither Hao nor Nutescu describe the "liner" or the "shield" thereof as "an inner chamber detachably disposed inside the vacuum container and having an

inner space in which a wafer table for supporting the wafer thereon is disposed and in which a processing gas is supplied”, (emphasis added), as recited in claim 7 on appeal. Thus, contrary to the position set forth by the Examiner, applicants submit that the claims recite structural or functional differences which must be given patentable consideration.

(2) As to the Examiner's contention concerning the lack of a wafer table in Hao, the Examiner contends that Hao was not relied upon for teaching this feature, but rather Nutescu discloses the feature. Applicants point out that while Nutescu discloses a pedestal 24 on which a wafer is placed during processing, such pedestal 24 is provided within the processing chamber delimited by the walls 10, and not within a chamber delimited by the shield 38, which presses against the interior of the walls of an aperture processing chamber. As such, the Examiner selectively chooses what features to consider and what features to ignore, which is not proper.

(3) Independent claim 7 further recites the features of:

a sidewall delimiting a part of the inner chamber and having an opening disposed therein through which the wafer to be supported on the wafer table is passed;

a gate disposed so as to enable communication with the opening in the sidewall of the inner chamber so as to enable transfer of the wafer from outside the vacuum container to the inner space of the inner chamber through the opening in the sidewall;
and

a valve disposed between the opening in the sidewall and the gate the valve being movable with respect to the outside of the sidewall of the inner chamber so as to open and close the opening and for sealing the opening in an airtight manner, a portion of the valve having a shape which does not interfere with the

axisymmetric structure of the inner chamber. (emphasis added).

The Examiner indicates with respect to the claimed feature of “the valve being movable with respect to the outside of the sidewall of the inner chamber so as to open and close the opening and for sealing the opening in an airtight manner”, the Examiner maintains the position that the valve (110) of Hao opens and closes the opening, is movable with respect to the outside wall of the inner chamber and that when the valve closes the opening, an airtight seal is formed for the opening via the valve mechanism which also includes another closing portion (108) which seals the outside chamber in an airtight/vacuum manner.

The entire chamber of Hao is held at a vacuum state (see column 3, rows 33 - 41), thus, the claimed opening is necessarily maintained in an airtight manner when the valves 108 and 110 are in a closed position, as claimed ... The claimed opening is sealed in an airtight manner in that the valve occupies the opening and no air is allowed to pass through the opening. See Fig. 3B.”

(emphasis added). Further, the Examiner points out that “Applicant’s claims do not specify that an air tight seal be created by a sealing surface of the inner chamber and the valve, which is the feature what Applicant appears to be arguing.” (emphasis added).

Irrespective of the Examiner’s contentions concerning valves 108 and 110 of Hao, in accordance with the disclosure of Hao, assuming arguendo, in accordance with the Examiner’s contention that the liner 102 is an inner chamber and has a sidewall delimiting part of the inner chamber, then it may be considered that the line or sidewall has an opening disposed therein, as

represented by the liner aperture, which is occupied by a liner aperture plate 110. It is not apparent what the Examiner considers to be a "gate disposed so as to enable communication with the opening in the sidewall of the inner chamber so as to enable transfer of the wafer from outside of the vacuum container to the inner space of the inner chamber through the opening in the sidewall" (emphasis added), as recited in claim 7, but it is apparent that the "liner aperture plate 110" is not a "valve disposed between the opening in the sidewall and the gate" the valve being movable with respect to the outside of the sidewall of the inner chamber so as to open and close the opening and for sealing the opening in an airtight manner. While Hao discloses at col. 4, lines 56 - 61 that a "slot valve plate 108 is configured to "sit on" the valve chamber 104 and covers the valve chamber aperture, the process chamber aperture and the liner aperture, thereby permitting the generation of a vacuum in the process chamber 104 (emphasis added), the slot valve plate 108 which may provide airtight sealing of the inner chamber 104 and the members disposed therein is not a valve disposed between the opening in the liner 102 and a gate, so as to open and close the opening in the liner and for sealing the opening of the liner in an airtight manner, as recited in claim 7 and the dependent claims. While the Examiner refers to Fig. 3B of Hao, it is readily apparent from such illustration that the inner chamber as represented by the liner 102 of Hao does not have the opening therein airtightly sealed by a valve disposed between the opening in the liner and a gate, which valve seals the opening in an airtight manner, as recited in claim 7. That is, as illustrated in Fig. 3B and described in column 4, lines

61 - 63, the liner aperture plate has sufficient clearance from the liner aperture, as illustrated in Fig. 3B to be able to move in and out of the liner aperture, whereas as described in column 5, lines 58 - 60 of Hao, the slot valve plate 108 permits the formation of a vacuum seal for the reactor 100. Thus, Hao, contrary to the Examiner's contention, Hao does not disclose or teach the recited features of claim 7, in the sense of 35 USC 103.

(4) While the Examiner does not agree that a teaching of a valve having the clearance to move in and out of an opening equates to a teaching of the apparatus failing to comprise a valve for sealing the opening in an airtight manner, applicants submit that Fig. 3B of Hao clearly illustrates an opening between the portions of the shield 102 delimiting the aperture therein, and the disclosure of Hao provides no suggestion of airtight sealing of the opening in the liner 102 by the aperture plate 110. On the other hand, Hao clearly discloses that the valve plate 108 noting that the disclosure of Hao does not suggest that the aperture plate 110 is a "valve" plate, clearly describes the valve plate 108 as being configured to "sit on" the valve chamber 104 and covers the valve chamber aperture so as to permit the formation of a vacuum seal. Again, the Examiner fails to give proper consideration to the structure as defined and the function performed by the structure as defined.

(5) The Examiner apparently contends that irrespective of the claimed structural features, Hao and Nutescu disclose equivalent structure. This position by the Examiner is not understood, since neither Hao nor Nutescu disclose an inner chamber disposed inside a vacuum container in which the inside of the

vacuum container is evacuated, and in which inner chamber, there is disposed a wafer table for supporting the wafer thereon, and in which inner chamber has an opening which is airtightly sealed by a valve, as recited in claim 7 and the dependent claims.

Appellants further note that the Examiner, as pointed out above, refers to valves 108 and 110 in Hao. As indicated above, Hao does not describe the aperture plate 110 as a “valve”, but on the other hand, does describe the slot plate 108 as a “valve”. Hereagain, Hao recognizes structural and functional differences between a valve and a member which is not a valve. The dependent claims of this application recite features which more clearly illustrate such differences. For example, dependent claims 15 and 17, which depend from claims 7 and 8, respectively, further recite the feature of “another valve disposed outside of the gate, the another valve being movable so as to open and close the gate and enable sealing of the gate in an airtight manner”. (emphasis added). Assuming in Hao that the outside of the process chamber 104 is closed and sealed by the slot valve 108 in an airtight manner as recited in claims 15 and 17, it is evident that the slot valve 108 cannot be considered as the valve disposed between the opening in the sidewall and the gate, and which seals the opening in an airtight manner. It is apparent that Hao does not disclose that the aperture plate 110 is a valve and that such aperture plate seals the liner 102 in an airtight manner, irrespective of the Examiner's contentions. Furthermore, due to the interconnection of the slot valve plate 108 and the aperture plate 110 wherein when the aperture plate 110 is within the aperture of the liner 102, the valve plate

108 seals the process chamber 104 of Hao, then it is readily apparent that the feature of dependent claims 16 and 18 of, the another valve when closing the gate enables sealing of the gate in an airtight manner while the inner chamber is removed from the vacuum container. Applicants submit that these claims recite a function which cannot be performed with the structure of Hao. Thus, it is apparent that the Examiner has failed to give proper consideration to the claimed features of the independent and dependent claims. This fact is further apparent by the recitation of dependent claim 19 which depends from independent claim 7 of “wherein the valve has a shape so that a portion thereof is insertable within the opening of the inner chamber for airtightly sealing the opening and to reduce unevenness on an inner surface of the inner chamber. That is, while the Examiner has contended in paragraph (3) above, that “applicant’s claims do not specify that an airtight seal be created by a sealing surface of the inner chamber and the valve which is the feature Applicant appears to be arguing”, this contention is based upon the Examiner’s failure to consider the claim language of all claims.

(6) As is apparent from the above, the Examiner has failed to give proper consideration to the disclosures of Hao and Nitescu with regard to what is a chamber and what is not a chamber, irrespective of what is “accepted terminology” and what is not “accepted terminology”.

For the foregoing reasons, applicants submit that the Examiner has failed to properly consider the recited structural features and the functional limitations, as set forth in independent claim 7 and the dependent claims thereof.

Accordingly, applicants request that the Board of Appeals reverse the Examiner's rejection of the claims on appeal.

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Terry, Stout & Kraus, Deposit Account No. 01-2135 (Case: 648.43120CX1), and
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Respectfully submitted,

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A handwritten signature in cursive script, appearing to read 'Melvin Kraus', is written above a horizontal line.

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